

80-10000 80mm Net System User Manual Version 1.09 Release Date: 7/03/2024



Cclipse Defense Technologies Inc 305 Blue Heron Rd Salisbury NC 28146 <u>www.eclipsedefense.com</u> <u>paul@eclipsedefense.com</u>

Warnings Read Carefully Before Use

This user manual must accompany the product in resale or new ownership

- The Eclipse Defense 80mm Launcher System is not a toy and may cause serious injury or death
- Never aim or shoot a launcher at a person or animal directly
- Never look directly into the barrel of the launcher when loaded. weight impact to the skull or body may cause death
- Always treat the launcher as loaded and fully pressurized
- Keep the fire control box unplugged until ready to fire
- Do not field strip or remove any parts on the system when the system is pressurized.
- Do not modify or adjust any parts
- Do not pressurize the system without all the components of the launcher correctly installed.
- Do not pressurize the system with unregulated air. Over-pressurization of the system may cause stress fractures in the material and cause injury.
- Compressed air or nitrogen only. Do not use any other compressed gas or pressurized liquid which includes but not limited to O2, CO2, H2.
- When not in use store in an indoor location in the provided container
- Never put any other object down the barrel besides the projectiles provided
- Check your surroundings and check what is beyond your designated net deployment zone in case the weights breaks free from the net.
- Post firing, depressurize in the launchers before heading down range
- Do not allow pressurized gas to come in contact with any body part.

- 18 years of age or above to use the system
- Observe all local and federal laws and regulations in-regards to the transportation and use of air launchers
- Do not stand directly behind system when firing
- Do not hold while firing, system must be on its ground mount while firing
- Base Plate must be spiked into the ground with at least 18 inch spikes

Table Of Contents

System Overview 4	ł
Setting Up the System	5
Arming The System	5
Airing The System	7
Firing The System	8
Charging The Fire Control Box and Remote Control Box	8
Maintenance	9
Main Piston Disassembly	9
Firing Piston Disassembly	10
Troubleshooting	1





Part Number:

- 1. Base Plate
- 2. Base Plate Arms
- 3. Valve Body
- 4. Back Cap
- 5. Main Piston
- 6. Output Body
- 7. Barrel
- 8. Ballast
- 9. Angle Adjustment Ring
- **10.Air Release Valve**
- **11.Trigger Piston Body**
- 12.Fill Nipple
- **13.CPU Housing Cover**
- **14.Wire Connectors**
- **15.CPU Housing**



Setting Up the System

- 1. The desired net of choice should be fully unrolled and stretched out with anchors staked into the ground or weights placed to prevent movement of net beyond deployment area.
- 2. Carry out each launcher box to their prospective spots. Pull the launcher out of the box and **check to make sure the air release valve (10) is in the open position shown in fig 4**. With this open it is safe to move the launcher and to go down range.
- 3. Attach the launcher to the base plate via the clevis pin. Lay the launcher flat on the ground while aligning the tip of the barrel over the back edge of the net.
- 4. Stake in the base plate with the rebar spikes provided, putting the two back spikes in first (furthest from the base plate arm). Remove the launcher and stake the front two spikes in. Make sure the spikes are fully in the ground.
- 5. Attach the launcher to the base plate arms via the clevis pin provided with the system.
- 6. Unfold the bi-pods and set the launchers to the required angle. This can be done by sliding the angle adjustment ring (9) along the barrel. The bi-pods legs can be extended for steeper angles.

The system should look like fig. 3 You are now ready to move onto arming and loading the launchers.



Arming The System

- 1. Inside each case there will be a 25-foot wire with waterproof connectors on both ends. One launcher case will have a 25 and 150 foot wire in it. These run from each launcher and connect to the fire control box.
- 2. Connect the 25-foot line between each of the launchers (fig 5). Note the input line always comes in on the left-hand side (Port A) of the launcher and the output line that goes to the next launcher is on the right (Port B) in fig 6. The 150-foot line can start on either side of the 4-line system and screws into port A of launcher. **Failure to follow with input on the left and output on the right, will prevent the lights in the fire control box lighting up.**
- 3. Solenoid and System check: the other end of the 150-foot line connects to the back side of the fire control box shown in fig 7. Connect to the port on the back side of the box (Port C). Next, turn the power on inside the box and make sure the equivalent number of lights come on for the number of launchers you are using. If one of the lights doesn't come on double check all connections.
- 4. Once all the lights come on, **double check all the air release valves are open. This assures the system isn't charged and is depressurized.** Next, push the fire button and listen for a clicking sound from the solenoids of all the launchers being used. You do not need to stand right on top of the launcher to hear this click, it will be loud enough to hear from a distance.
- 5. Disconnect the 150-foot line from the fire control box until ready to fire.
- 6. Connect each of the weights provided with the system to the net via locking carabiners. It is recommended the lead line be shorted to the point they are tight and pulling the net up slightly when the weights fully seated in the barrel.
- 7. Once the weights are attached to the lead lines and the lines are the correct length you can go ahead and slide the weights down the barrel. If this is your first launch for the year, go ahead and add a little bit of silicon lube (provided) to the weights. This will help with sliding the weights down the barrel. You will know the weights is fully seated by two methods, hearing the thud of the weight hitting the valve wall or using a wooden ram rod and making sure the weight can't go any deeper.
- 8. Move onto airing up the system.



Fig 7

В

Airing The System

- 1. Take the SCUBA tank provided with system and attach the regulator unit provided with the system. **NEVER FILL THE LAUNCHER STRAIGHT FROM THE SCUBA TANK WITHOUT THE REGULATOR UNIT!!!**
- 2. The regulator unit clamps onto the SCUBA nozzle. Slide the black rectangular metal unit over the top of the SCUBA nozzle, while lining up the metal ring inside the black rectangular metal square cutout with the nozzle on the SCUBA tank. Use large threaded knob (1) to screw down and hold the black rectangular unit onto the tank. Make sure this is snug fit to make sure no air leaks during the filling process.
- 3. Attach hose (6) to the quick connect fitting shown in fig 4. On the end of the hose (6), there will be a quick connect fitting. Fig 8 shows this connector and how to pull it back to connect it onto fitting shown in fig 4. Make sure the connector fully seats onto the fitting in fig 4. If not, it will pop off when the launcher starts to be aired. You can do so by making sure the connector fully extends as shown on the left in fig 8. Give it a little tug to make sure it doesn't pop off.
- 4. Screw in the small threaded knob (2) until nice and tight. This is the bleed off valve to release pressure in the line post filling. If you hear air leaking while filling this is most likely the cause.
- 5. Check to make sure no one is down range of the system; tell team members in the area you are charging the system and to stay clear.
- 6. Turn large plastic knob (4), crack the SCUBA tank open and slowly turn this knob 1 to 2 full turn. You will hear the air start flowing into the launcher. Give it about 1- 2 minutes to fill. You will hear the flow start decreasing when the launcher is near full. When you don't hear any more air flowing through the regulator the launcher is fully charged.
- 7. Check the gauge on the top side of the launcher to make sure it is at the psi desired. The regulator should be set to approximately

275-300 psi. Turning knob (3) with a hex wrench clockwise will increase, counter-clockwise will decrease pressure in the launcher.

- 8. Turn the air release valve shown in fig 4 90 degrees to the off position.
- 9. Tighten large plastic knob (4). This will shut off the air supply.
- 10. Unscrew small threaded knob (2) this will release all the pressure left in hose (6). Disconnect hose from launcher.
- 11. Move on to the next launcher and repeat steps 3 10. Until all are filled and ready to deploy.





Fig 8

Fig 9

Firing the System

Via Wired Connection

- 1. When everyone has cleared the area and you are in your designated area, attach the end of the 100-foot line into port C of the fire control box shown in fig 7.
- 2. Power on the system by pushing the **power** button inside of the fire control box. The number of lights for the number of launchers being used should show up (all 4 for a 4-line system, 3 out of 4 for a 3-line system etc.)
- 3. When ready, push the **fire** button to deploy the net system.
- 4. Turn the air release valve (10) 90 degrees to the open position to allow any remaining air to be released from the system.
- 5. Push the **fire** button 2 to 3 times, to release any extra air in the solenoid and trigger valve. The pressure gauge should read zero at this point
- 6. Push the **power** button again to turn the system back off once deployed.

Via Remote Control

- 1. When everyone has cleared the area and you are in your designated area, attach the end of the 100-foot line into port C of the fire control box shown in fig 7.
- 2. Power on the system by pushing the **power** button inside of the fire control box. The number of lights for the number of launchers being used should show up (all 4 for a 4-line system, 3 out of 4 for a 3-line system etc.)
- 3. Push the remote-control button to the **on** position. Leave the system turned on and close the box shut to seal it from any outdoor weather. The batteries inside the fire control box have enough power to stay active for up to 24 hours when fully charged.
- 4. When ready to fire, turn the remote control on and wait 30 seconds to 1 min to make sure the controller has made connections to the fire control unit.
- 5. When ready, push the **fire** button to deploy the net system.
- 6. Push the **power** button back off on the remote unit.
- 7. Turn the air release valve (10) 90 degrees to the open position to allow any remaining air to be released from the system.
- 8. Push the **fire** button 2 to 3 times on either the remote or Main Box, to release any extra air in the solenoid and trigger valve. The pressure gauge should read zero at this point.
- 9. Open the fire control box and push the **power** button again to turn the system back off.

Disarming the System and Degassing the system

- 1. With everyone clear of the system, turn off the remote unit, turn off the main fire control box and remove the 100 foot connector from the back of the box.
- 2. WALK BEHIND THE LAUNCHERS to each of the air release valves and rotate the handle 90 degrees to allow the air to be released from the system. Stay clear of this nozzle as the air will be rushing out.
- 3. Once all the system have been degassed, stand clear of the system and attached the 100 foot cable to the main fire control box.
- 4. Push the **power** button, then the **fire** button 2 to 3 times, to release any extra air in the solenoid and trigger valve. The pressure gauge should read zero at this point.
- 5. Turn the system back off and remove all connectors
- 6. With the pressure gauges reading zero, it is safe to pull the round out of the barrels. The system has been disarmed.

Remote Control Box Indicators All Three need to be on to fire the system with the remote

Blue Light:

Connected to the main box and in range when the light is on

Yellow Light:

Battery status of main fire control box. When the light is on the main fire control box voltage level is high enough to fire the system

Green Light:

Launcher Status on main fire control box. When the light is on the number of units connected to the main box is the same as the dip switch number set inside the Remote box. Dip switch set to 3, and three lines connected to the main fire control box the green light will come on.

Please note if you are using a 4 line system and you wish to fire a 3 line system. You need to turn dip switch 4 on and turn dip switch 3 back off inside the remote unit. It also doesn't require you to use system 1,2,3 when firing in 3 line mode. It will still work with 1,3,4 or any combination of three, just 3 lights have to be on in the main fire control box.

Adjusting the Number of Line in the Remote Control Box.

The remote control box requires you to have the correct dip switch set for the number of line you are firing. The Dip switches can be found to the right of the 3 AA batteries inside of the remote control box. Remove the all head screws, open the top of the remote box and adjust the dip switches

4 line system: dip switch #4 on (slide to the right), all other off (to the left) 3 line system: dip switch #3 on (slide to the right), all others off (to the left)

Charging the Fire Control Box and Remote-Control Box

Fire Control Box

Provided with the fire control unit is a wall plug power charging unit. Plug it into the wall and plug the cable into the power charging port on the unit. The unit is fully charged when the light on the wall charger goes from red to green. A fully charged unit should provide 24 hours of continuous use and should take about 4 to 5 hours to recharge.

Remote-Control Box

Unscrew the 4 screws on the remote box and remove the 2 halves of the box. Inside there will be a three AA battery. Change this battery every year before use.

Maintenance

Required Tools: 3/32" Hex wrench 9/64" Hex wrench 5/32" Hex wrench

Super O-ring Lube Dead Blow Hammer Wooden Rod

Plastic Gloves Torque Wrench

Maintenance on this system is broken down into two main components, the main piston and the trigger piston. These parts should be disassembled yearly, re-lubricated and re-assembled. It is important to use the same lubrication on all launchers. If different lubrication is used it may cause launchers to fire unsynchronized. Use only Super O-ring Lube.

MAKE SURE THE AIR RELEASE VALVE IS OPEN AND THE SYSTEM IS DEPRESSURIZED



Main Piston Disassembly

- 1. Using the 5/32" hex wrench, unscrew the twelve #10-32 on the back cap (4) and set them aside.
- 2. Pull on the eye hole screwed into the back cap (4) and pull the back cap and spring out of the launcher. Inspect O-ring (60) for any damage or cuts. If damaged, replace.
- 3. Set the launcher vertically with the barrel in the air and the (3) valve body resting on the bench. Using a wooden rod, slide it into the barrel and into the notch on the front side of the piston. Push Down on the wooden rod and push the piston out. Sometimes a light tap from a dead blow hammer on the end of the wooden rod will help to get the main piston it moving.
- 4. Once the piston starts moving, turn the launcher horizontally and finish pushing the piston out of the launcher.
- 5. Inspect O-rings number (52) and (49) for any damage or cut, replace if necessary
- 6. Apply ¹/₄" of O-ring lube to your finger tips and work it into the O-ring. Apply fully around the O-ring, add more O-ring lube if needed.
- 7. Push the piston back into the valve body (3) until it is fully seated. You can push on the back ring until it stops moving.
- 8. Add O-ring lube to the O-ring (60), put the spring back inside the piston and then slide the back cap back (4) in place. Align the eye loop vertically with the system, this should align the screw hole with the tapped holes in the valve body (3).
- 9. Push the back cap (4) down until it is flat against the valve body (3). Start screwing in three of the twelve screws with equal spacing making sure they have a dab of blue Loctite on the screws. Screw these down until they are just finger tight, do not over tighten.

10. Add a dab of blue Loctite to the other 9 screws and screw them in until they are finger tight and in a crisscross pattern. Tighten all 12 screws in a crisscross pattern (similar to tightening lug nuts on a car) to a max of 15 in-lbs.

Firing Piston Disassembly

- 1. Using the 3/32 hex wrench, remove the four bolts on the CPU board cover (13). (fig.11)
- 2. Using the 9/64 hex wrench, remove the four bolts holding the (15) CPU housing. Allowing the computer housing board to be free from the trigger piston housing (11). (fig 11)
- Use the 9/64 and 5/32 Hex wrench to remove the 2 bolts holding the trigger piston housing(11) from the valve body (3). (fig. 11)
- 4. With the (11) trigger piston housing free, use the 3/32 Hex wrench to remove the 556 screws on the front of the housing near O-ring 59. Remove this part.
- 5. Using your fingers, push a smaller piston out from the housing and inspect all three O-rings (50,51,54) for damage.
- 6. Inspect O-rings (59,57,58) and the four O-rings on the bottom of the housing (O-ring #56).
- 7. Apply new lubrication1 to all O-rings shown in figures 12, 13, and 14. Push the piston back into the housing. Due to the spring the piston is likely to pop back up. This is okay.
- 8. Push the cap on the other end back in and screw the four screws back in hand tight. Max of 3 in-lbs.
- 9. Screw the CPU housing (15) back onto the trigger piston housing (11). Make sure to apply a dab of Loctite to these screws before putting back in. Max of 7 inlbs.



10. Screw the CPU cover(13) back onto the CPU board housing (15). Max 7 in-lbs.

11. Screw the Complete trigger piston housing (11) back onto the valve body (3). Tighten the #10-32 screws to 15 in-lbs. max, #8-32 screws to 7 in/lbs. max.



Fig 11

Troubleshooting

• One of the launchers fires before or after the other launchers in the group.

- Disassemble the launchers and check the O-rings stated in the maintenance section, make sure to check out O-ring number (58). Make sure to use the same O-ring lubrication between all the different launchers, using different O-ring lubrication will cause launchers not to fire in synchronized.
- System sounds like it is leaking when filling the launchers with air.
 - In figure 10 the small threaded knob (2) needs to be tightened more. Check to make sure the quick connector (fig 8) is fully seated fill nipple on the valve.
- Leaking from one of the brass fittings, or fittings on the regulator.
 - Disassemble the parts that are leaking, clean off the thread sealant with a wire brush. Once clean, apply Loctite 567 thread sealant. Allow for 24-72 hours to completely cure and dry before use. If quicker turned around is need blue Teflon table can be used, but not recommended for long term use.
- Status lights for the launchers do not show up in the fire control box.
 - Check to make sure the wire connections are set up correctly. The input line comes in the left-hand side of the box and the output line connects to the right side of the CPU box. Make sure the 100-foot wire connection line comes out from the fire control box to the left or right most launcher in the system.
- The net deploy in a C shape pattern, but more a straight line.
 - Tighten up the lead lines between the weight and the folded net. It is recommended the lead line be shorted to the point they are tight and pulling the net up slightly when the weights fully seated in the barrel.
- The Launcher makes a thud sound while filling full of air.
 - This is normal, it is the main piston fully pushing forward and the second set of seals engaging.

• Sounds like Air is leaking out the front of the barrel when filling the launchers.

- Stop filling the launcher by turning the large plastic knob (4) in fig 9 in a clockwise rotation. Turn small thread knob (2) in fig 9, and remove the hose (6) from the launcher. Make sure the air release valve (10)is open and the system is full depressurized. Next, pull the weight from the end of the barrel via the ropes attached to the weights. Unscrew the twelve screws from the back cap and pull out the main piston. Look down into the valve for a broken Oring or foreign objects not allowing the main piston to fully seat.
- Air is leaking from the top of the valve near the firing piston housing.
 - Disassemble the firing housing, make sure all 4 of the of the O-rings are on the bottom side of the housing. Next, check the condition of the O-ring along the firing piston, check inside the housing for any foreign objects that may have gotten in the system. Check for any scratches along the walls of the valve housing. Reassemble the valve parts and test. If the leaking air sounds persist, open the computer housing and check to see if it is leaking from the back side of the solenoid. If it is leaking from the back side of the solenoid, email or call Eclipse Defense as a new solenoid might be needed.
 - If it is still leaking, disassemble the main piston. Check the O-rings on the main piston and the internal walls of the main valve. Look for any scratches in the walls. Re-lube all of the

O-rings, reassemble, then pressure test the valve. If scratches in the wall are found, email Eclipse Defense with photos of the damage.

Part Number	O-Ring Dash Number	Qty
52	334 (X or Round)	4
49	342 (X or Round)	1
60	222 (X or Round)	1
54	116 (X or Round)	1
51	114 (X or Round)	1
50	110 (X or Round)	1
59	2-019 square	1
58	2-023 square	1
56	2-008 Square	4
57	2-007 Square	1

O-ring List

O-ring Material: Buna-N Orings Durometer: 70A

APPENDIX I – Supplement Information (From USFWS)

A primary goal for the development of the pneumatic cannon system was to retain the current infrastructure of nets that are available at many field stations. Due to the difference in propelling the projectiles (military grade propellant vs. high compressed air), the set up configuration for the pneumatic cannon system is different. We present recommendations for a firing configuration for ground applications based on system testing. However, because of the difference size and weights of nets and banding locations (i.e., local substrates), it is important to test your system and make adjustments based on your nets and local conditions. *Note:* the information provided is for ground launching only. Different shot configurations (i.e., box or elevated shots) will require additional testing.

Initial Pressure Setting

Traditional rocket-nets, using propellant, travel approximately 107 feet per second. Initial testing revealed that the pneumatic cannon system set at 250 psi, was approximately .01 second slower than a traditional rocket-net. We recommend initial settings for the pneumatic cannon system between 250 and 275 psi when using the 24-inch barrels and a 40' x 60', 1.25 inch-mesh net that weighs approximately 35 lbs. If your cannon system has 12-inch barrels, we recommend an initial setting of 325 to 350 psi, when using a 40' x 60' net. Please follow the instructions in this manual when changing the pressure.

Ground Cannon Placement

The ground set-up is similar to a traditional rocket-net system, where the cannons are placed behind the net (Figure 1). We recommend that the base plate is placed at minimum 4-feet behind the net. As with rocket-nets, center cannon(s) should be placed in-line with the middle of the 3-projectile leads. The placement for the end cannons should be placed 6-feet from the end and place at a slight angle (e.g., < 10 degrees) towards the outside of the net (Fig. 1). The placement for the outside cannons maximizes the stretch of the net and reduces the recoil roll of the outside projectiles back onto the net. Figure 1



Modification to the Projectile Leads of the Net

Due to using high compressed air, the net will shoot flatter than when using compared with a rocket-net charges. Your goal is to achieve a "C" shape curve (figure 2) in the net in order to clear the target animals. To achieve the traditional 3-5 degrees clearance for capturing waterfowl, the cannon barrel should be set at 21 degrees. This can be achieved with an angle finder or an angle finder application on most phones. It is highly recommended to check the angle during set up for each shot. It would be incorrect to assume that angle is the same for each cannon after placement. For larger birds, such as geese, you may need to set the cannons at a higher angle and should test for clearance prior to firing on live birds.

Figure 2



In order to achieve the "C" shape, the middle projectile leads will need to be shortened. Initial testing used a 40' x 60' net and the middle projectile leads were shortened approximately to the length of 65 inches from the end of net (or rope thimble) to the end of the lead loop (Figure 3). The outside net projectile leads were unmodified. We recommend an overhand knot if you are going to continue to use the net with rockets as well.

Figure 3



TIPS

We recommend setting a "dummy" cannons prior to setting up the system, in order for the target animals to get comfortable with the setup. We used 4-inch, PVC sewer drainpipe, cut to 24-inch lengths, and spray painted green. We propped the PVC sewer drainpipe with 1-2 foot rebar. Finally, we covered the drainpipe with surrounding ground cover or ghillie suit material (Figure 4). Figure 4

